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Dealing with negative feelings

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Summary

Dealing with negative feelings: The role of working memory in emotion regulation.

Though negative emotions are often adaptive, they can occupy people's thoughts unwantedly and thereby undermine psychological and physical well-being. It is therefore important to look for ways in which people can shield themselves against the disruptive power of negative emotion. The pervasiveness of negative emotions is partly due to the strong impact of negative information on the human attention system. Consequently, one potentially effective way to deal with negative emotions may be to control the amount of attention that is to negative information. The present dissertation examines how processing of negative emotional information is influenced by the availability of working memory resources. Chapter 1 provides a theoretical overview and Chapters 2 to 4 report empirical tests of the role of working memory in dealing with negatively charged information.

Chapter 1 introduces the key concepts of the present dissertation, which consist of attention, working memory, negative emotion, and their interplay, and provides an overview of relevant empirical findings on the role of working memory in dealing with negative emotions. The theoretical relations between these concepts are organized by a working memory model of distraction from negative emotion (Van Dillen & Koole, 2007). The central idea of the model is that distraction involves the use of limited processing capacity in working memory. The more working memory is being used by a distracting activity, the less room will remain for negative emotions to persist. The remainder of Chapter 1 considers how the working memory model fits with the empirical literature, including the research that is presented in Chapters 2-4. Moreover, the model's limitations and implications are discussed, along with directions for future work.

Chapter 2 describes three experiments that examined whether and how loading working memory can attenuate negative mood. Participants were exposed to neutral, weakly negative or strongly negative pictures followed by a task and a mood scale. Working memory demands were varied by manipulating task presence (Study 1), complexity (Study 2), and predictability (Study 3). Participants in all three experiments reported less negative moods in negative trials with high compared to low working memory demand. Working memory demands did not affect mood in the neutral trials. When working memory demands were high, participants no longer reported more negative moods in response to strongly negative pictures than to weakly negative pictures. These findings suggest that loading working memory prevents mood-congruent processing, and thereby promotes distraction from negative moods.

Chapter 3 describes an experimental study which examined whether loading working memory not only modulates subjective experience of negative emotion, but also the unfolding of emotional brain responses. Using functional magnetic resonance imaging (fMRI), task load was found to result in

increased activation in working memory regions (right dorsolateral frontal cortex, right superior parietal cortex), but in decreased responsivity to negative scenes in emotional regions (the bilateral amygdalae and the right inferior insula). In line with previous research, task load also reduced subjectively experienced negative emotion in response to negative scenes. Together, these findings support a model in which emotional and non-emotional information compete for the limited capacity of working memory.

Chapter 4 reports two experiments that examined the effect of working memory load on unintentional intrusions of negative information on attentional processing. Whereas attentional interference of negative information has been assumed to be automatic and unavoidable (Pratto & John, 1991), Chapter 4 advances the hypothesis that this effect may depend on the availability of working memory resources. In two experiments, participants judged the gender of angry versus happy faces. Working memory load was manipulated by the presence or absence of a math task (Study 1) or mental rehearsal of a one- versus eight-digit number (Study 2). The results showed that angry faces interfered more with gender naming than happy faces, but only when working memory load was low. These results indicate that attentional interference of negative information can be modulated by top-down attentional control processes.

Taken together, the present dissertation suggests that working memory plays a vital role in dealing with negative emotion. Indeed, taxing working memory was found to moderate the impact of negative emotional stimuli on negative feelings (**Chapter 2 and 3**), circuits within the emotional brain (**Chapter 3**) and attentional interference of negative information (**Chapter 4**). As such, the present dissertation demonstrates how, despite the pervasive impact of negative emotional information, people may be capable of regulating negative emotional responses in accord with ongoing task demands and goal-directed activities.